AN INVESTIGATION OF THE LINK BETWEEN SPIRITUALITY AND INTELLIGENCE

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Abstract

Self-rated religiosity has been studied alongside intelligence for nearly 100 years. The predominant finding is a negative relationship between measures of self-rated religiosity and individual measures of intelligence. That is, as intelligence increases, the degree of self-rated religiosity decreases; as intelligence scores decrease, self-rated religiosity tends to increase. Spirituality has been studied intermittently as a separate theoretical construct since the 1970's and there has been a recent empirical drive to consider and refer to these concepts separately. Valid and reliable measures of intelligence have not yet been examined alongside empirically validated, individual, self-rated measures of spirituality. In this study, 44 undergraduate students from the University of Saskatchewan completed the Shipley-2 abbreviated test of intelligence and the Spiritual Well Being Questionnaire (SWBQ). Due to the nature of religiosity relative to spirituality, as well as individual differences in characteristic propensities to engage in logical reasoning, it was hypothesized that when compared to past research examining measured intelligence relative to self-endorsed measures of religiosity, a relatively weak relationship would be observed. The nature and strength of the relationship between self-rated measures of spirituality and measured intelligence was nearly identical to a recent meta-analysis study examining the relationship between self-rated religiosity and measured intelligence. However, a relatively strong negative relationship was observed between the transcendent factor of the SWBQ – the factor most closely associated with notions of a God, religion, or religiosity – and intelligence. This finding supports the hypothesis and suggests that perhaps it is the notion of a God or other sentient being that is driving or inflating the widely observed negative relationship between self-rated religiosity and intelligence.

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CHAPTER 1: INTRODUCTION

An Investigation of the Link Between Spirituality and Intelligence

As I age, I find myself grappling with many of the seemingly universal existential questions people often struggle with across their lifespan. Death, loneliness, one's own purpose, and, more generally, the *meaning* of life – are all examples. Aside from those who have maintained apparent unwavering faith throughout their lives, it seems to me that often people gravitate towards religion or other means of spirituality to gain comfort, insight, guidance, and even answers when confronted with existential questions for which, one could rather easily argue, albeit far beyond the scope of the current research, *no* universal conclusion exists. I fall into the latter; seeking out something to assist and direct me whilst confronting some of these questions.

As someone who has experienced a single religion (i.e., Roman Catholicism) across a wide spectrum of devotional stages, first as a young believer/follower/monotheist, then a short period of apostasy followed soon after by agnosticism, I now find myself reexamining religion and spirituality, as separate constructs, from a functional and somewhat objective perspective. That is, regardless of my own personal beliefs, I am able to recognize that religion and/or spirituality function to help people cope with many of the uncertainties in life such as loss, loneliness, day-to-day difficulties, to construct meaning in their own lives, as well as to live with a relative degree of moral integrity. I have a great deal of admiration for individuals who are able to make informed and clear decisions regarding their own personal religiosity and spirituality in a concerted effort to live happier, more fulfilling lives. I do not intend for any of the information or topics addressed in this research paper to be construed as offensive and I have no agenda outside that which will be stated.

While trying to decide on a suitable thesis topic, I happened across an article outlining a negative correlation between intelligence and religiosity. Initially, I found myself somewhat perturbed by the seemingly dominant presentation of this apparent robust negative correlation between intelligence and self-reported religiosity. More specifically, I was concerned about how these results could be interpreted. Rather than continue to perpetuate the prevalent juxtaposition of religion and science however, I would like to stress that I have resolved to examine this topic from a personal lens of functionality. As already mentioned, religion, whatever form or sect, undoubtedly helps many individuals live happier and more fulfilling lives. I think this, above all

else, needs to acknowledged, respected and celebrated. Finally, this brings me to why this particular avenue of research is important to me.

As mentioned earlier, I am now at a period in my life where I am beginning to develop a deep intrinsic motivation to both objectively (to whatever degree this is possible) and subjectively approach existential questions. For lack of better terms, these are *big* questions that many great philosophers as well as people from all walks of life have grappled with, most likely as early as human cognition permitted. Approaching this specific area of research will allow and necessitate an examination of literature pertaining to religiosity, spirituality and intelligence, all of which are areas of great personal interest to me. These areas of research are all constantly changing, evolving, and deal largely with abstract, theoretical constructs. As such, I will be required to examine these areas holistically from historical, contextual, qualitative and quantitative perspectives. In doing so, I hope not only to eventually contribute to this ever-expanding area of research; I also hope to gain a solid foundation or framework from which I can personally approach my own existential struggles. I will now briefly broach the more specific area of research that both startled me and, at the same time, sparked my own curiosity.

Religiosity as it Pertains to Intelligence

Beginning in the late 1920's, a new and somewhat controversial area of interest in the field of psychology began gaining momentum. Howells (1928) and Sinclair (1928) published separate empirical articles wherein similar findings were noted. Namely, as intelligence increased throughout their respective sample populations, self-rated religious belief decreased. Following a lull in empirical research examining religiosity relative to health or psychologically-related concepts during the 1930's to 1960's, numerous conflicting results were published both refuting and supporting those initial claims (Argyle, 1958; Francis, 1998; Hoge 1969). More recently however, the latter is becoming widely empirically supported (see Zuckerman, Silberman & Hall, 2013 for an extensive review). Indeed, an immensely large study, spanning across 137 nations - purportedly representing over 95% of the world's religious populations, concluded with a robust negative correlation between self-rated religiosity and intelligence (Lynn, Harvey, & Nyborg, 2009). But what do religiosity and spirituality mean? How are they operationalized and moreover, do they actually refer to the same abstract theoretical construct as many researchers and therefore, historical research has assumed?

A recent review of studies examining religiosity and spirituality as separate, measureable theoretical constructs indicated some glaring weaknesses that may, at least partially, account for the sporadic and often conflicting empirical results when religiosity or spirituality are being examined. Berry (2005) noted that many authors often inadequately define the very constructs they purport to examine. Additionally, Berry (2005) noted that authors often employ the use of poorly developed or overly simplistic inventories to measure religiosity and spirituality. Among other recommendations, he outlines the need for future studies to regard spirituality and religiosity as separate constructs and notes that often studies of this nature are confounded when the authors refer to spirituality and religiosity as a unitary construct or variable. This particular methodological pitfall effectively yields a new area for empirical exploration. Whereas previous research has been concerned with the nature of the relationship between intelligence and self-rated religiosity, no research has been conducted wherein self-rated *spirituality* has been examined alongside a valid and reliable measure of intelligence.

Religiosity or Spirituality?

When reviewing literature concerned with religiosity or spirituality, one might quickly discern that even the task of defining these somewhat broad, subjective, and abstract theoretical concepts is a daunting undertaking in and of itself. Indeed, both religiosity and spirituality appear to be notoriously difficult to define. Further, some authors argue that religiosity, and to a relatively higher degree - spirituality - are experienced subjectively, effectively making them even *more* difficult to consensually define (Atran & Norenzayan, 2004; Berry, 2005; Bertsch & Pesta, 2009; Houskamp, Fisher, & Stuber, 2004; Kosa & Schommer, 1961). Thus, although arguably necessary, there is no consensual definition of spirituality *or* religiosity. In order to study these constructs as they might relate to health factors (i.e., happiness and subjective wellbeing) or intelligence, for example, authors have attempted to separate these abstract constructs conceptually.

For example, when examining how spirituality and religiosity might differentially impact happiness in children, Holder, Coleman and Wallace (2010) were required to operationalize these terms. Although a more thorough examination of these terms will follow in Chapter two of this document, the authors' definition is succinct, useable and easily approached. "Spirituality refers to an inner belief system that a person relies on for strength and comfort whereas

religiousness refers to institutional religious rituals, practices, and beliefs." (p. 132). Although brief and perhaps even over-simplistic, this definition hints at the underlying conceptual disunion that exists between religiosity and spirituality. Indeed, one can imagine that it is possible for an individual to be spiritual but not religious (e.g., not attend church yet possess a strong inner belief system), religious but not spiritual (e.g., attend church in body but not necessarily engage any further – as young children are often wont to do), both religious *and* spiritual and neither religious nor spiritual. Considering this concise definition and the conceptual distinction between religiosity and spirituality as well as the historical relation between intelligence and religiosity, I will proceed to outline the proposed study.

The Proposed Study

Historically, there has been a great deal of empirical research examining how variables such as education attainment, socioeconomic status and/or intelligence fluctuate alongside self-rated religiosity (Holder, Coleman & Wallace, 2010; Zuckerman, Silberman & Hall, 2013). While not a central concern for this particular research, it should be noted that a variety of inventories have been used over the past 90 years to examine religiosity as a theoretical construct and variable. Regardless of the inventory used, results have converged on a robust negative correlation between intelligence and self-rated religiosity. However, there is virtually no literature that approaches and explores *spirituality* as a variable alongside intelligence. Due to the evident lack of empirical literature exploring the potential relationship of these two variables, I will attempt to quantitatively examine this area using the *Spiritual Well-Being Questionnaire* (SWBQ), a well-established and reliable inventory to measure spirituality as a separate construct from religiosity (see Gomez & Fisher, 2003, 2005 for a review). The SWBQ comprises half of the *Personality and Individual Differences* inventory developed by the same authors and has since been utilized in many studies as a measure of spirituality. Most importantly, the SWBQ has been independently validated as an appropriate, valid, and reliable measure of spirituality (Meezenbroek et al., 2012). I will then attempt to correlate results obtained on the SWBQ to individual results obtained on the Shipley-2, a brief, yet reliable and valid estimate of general intellectual functioning (Kaya, Delen, & Bulut, 2012). Thus, the research question becomes: Given the historically robust negative correlation between self-rated religiosity and intelligence, what is the nature of the relationship between intelligence and self-rated *spirituality*?

CHAPTER 2: LITERATURE REVIEW

Psychology and Religion

Dating back to the late 1920's, individual intelligence has been explored in relation to religiosity, religious belief, or religiousness (Bertsch & Pesta, 2009; Zuckerman, Silberman, & Hall, 2013) and two of the earliest studies were published by Howells (1928) and Sinclair (1928). At this time, both authors independently observed negative correlations between intelligence and measures of religiosity. As one might imagine, the implications for publishing such a relationship were potentially substantial and, accordingly, Zuckerman, Silberman, and Hall (2013) noted that empirically observed correlations or rather – inferences potentially drawn from observed correlations – have historically spurred a great deal of subsequent research and controversy. This interest and controversy was likely a result of the prospective thematic inferences these findings could propagate. For example, that religious beliefs are irrational, illogical, and counterintuitive, that uneducated individuals tend to rely on more comfortable beliefs or that intelligent people tend to rebel against conventional modes of thought (Pennycook, Cheyne, Seli, Koehler, & Fuglesang, 2012; Zuckerman, Silberman, & Hall, 2013). However, the fervor surrounding this research was short-lived and as such, lasted only briefly into the 1930's.

After this time, there was an apparent lull in empirical research examining religion or religiosity relative to health or psychologically-related concepts. This lull lasted until the 1960's when empirical studies examining religiosity, religious belief, or religiousness relative to intelligence or other health-indicators began gaining momentum once again. Interestingly, a large methodological pitfall that existed when research of this nature was in its infancy nearly a century ago still exists today.

Berry (2005) reviewed empirical articles that addressed religiosity as either a key concept or as a variable. From this review, he outlined themes that became abundantly clear when reviewing current and historical empirical literature pertaining to religiosity (which, from this point on will encompass terms such as religiousness and religious belief). First, there is still no consensual definition of the term religiosity. Indeed, Berry noted that empirical attempts to define religiosity date back as early as the 1800's and still no consensus exists. This observation is problematic for a number of reasons and raises an important question: How can one objectively define an abstract theoretical concept that is largely experienced subjectively?

For example, Berry (2005) pointed out that many definitions and inventories designed to measure religiosity either originate or hinge upon common, western, Judeo-Christian conceptualizations of faith. Therefore, utilizing definitions or constructing inventories intended to quantify religiosity that, in some way, originate from but a single religion becomes especially problematic when attempting to study individuals from different cultures, religious denominations or sects. For this reason it is important to be cognizant of the population one is studying, and, at the very least; limiting hypotheses or theories generated from the study of a particular population to that same population.

The second observation and methodological pitfall outlined by Berry (2005) was the tendency for authors to refer to religiosity and spirituality as unitary concepts. As already mentioned in the introduction, while religiosity and spirituality may be conceptualized as being assumed by one or the other, treating this conceptual union as universal is not always wholly representative. The issue of this union or rather - potential disunion, will be covered later in this thesis.

Defining Religiosity

As mentioned earlier, when reviewing literature pertaining to religiosity, one may quickly gather that reaching a consensual definition of religiosity has historically been a daunting task. The subjective, fluid and evolving nature with which religiosity is often experienced, coupled with both subtle and large differences between specific religions or sects are all certainly factors that contribute to this difficulty (Arnett & Jensen, 2002; Argue, Johnson & White, 1999; Bloom, 2007). Therefore, when attempting to define religiosity, it is essential that the definition is specific enough to carry definite, relevant meaning; yet not too specific so as to eliminate certain sects or religions in the process.

Atran and Norenzayan (2004) eloquently presented four common elements that, when combined, constitute an exceptionally comprehensive definition of religion. In each society, there exists: (1) a widespread counterfactual or counterintuitive belief in supernatural agents. The authors provide God(s), Demons and Ghosts as examples; (2) in each society there are also public expressions, offerings, gifts or sacrifices to their respective God(s), Demons or Ghosts. These offerings could be monetary in nature (i.e., tithing), material goods such as property, or even time spent in prayer or at mass; (3) these supernatural agents (i.e., God(s) or Ghosts) aid or allow individuals to master, make sense of, or manage common existential anxieties such a

death, loneliness, catastrophe, pain, loss or injustice; (4) "Ritualized, rhythmic sensory coordination of (1), (2), and (3), that is, communion (congregation, intimate fellowship, etc.)" (p. 713). The authors conclude their inclusive definition by noting: "In all societies there is an evolutionary canalization and convergence of (1), (2), (3), and (4) that tends towards what we shall refer to as "religion"; that is, passionate communal displays of costly commitments to counterintuitive worlds governed by supernatural agents"(p. 713).

The first element in Atran and Norenzayan's (2004) definition of religion is a counterintuitive and counterfactual belief in supernatural agents. This element is readily present among existing empirical literature and, in some cases even presented more boldly. For example, Sedikides (2010) sourced empirical literature that coincides with this first element. "Religions – at least in their popular form – are, it has been argued, irrational, contradictory, pathological, illusory, exploitive, and potentially dangerous" (p. 3). Recent research by Pennycook, Cheyne, Seli, Koehler and, Fuglesang (2012) not only supports Atran and Norenzayan's (2004) first definitional element of religion, that is, one's degree of religious belief may indeed be related to one's individual style of cognitive reasoning, it also highlights how individual intuitive reasoning tendencies may be related to counterintuitive belief in supernatural agents.

Pennycook et al. (2012) outline two basic styles of cognitive reasoning; intuitive and analytic. Analytic reasoning is defined as, "a propensity to set aside highly salient intuitions when engaging in problem solving," whereas intuitive reasoning is the tendency to think heuristically, unconsciously and often, as a result, come to conclusions quickly" (p. 335). The latter style of reasoning could informally be described as using one's gut feeling to arrive at conclusions – potentially in the absence of fact or evidence. While one can undoubtedly engage in either or both forms of reasoning, it is implied that individuals tend to characteristically engage in certain styles of cognitive reasoning when presented with specific types of problems or information (Evans, 2008). The authors found that participants who exhibited a tendency to engage in effortful, analytic reasoning were *less* likely to endorse supernatural beliefs (e.g., religious, spiritual or extrasensory perception) than those who more readily engaged in intuitive reasoning. This observed tendency was present even after controlling for level of religious involvement, age, sex, political ideology and education. It logically follows then, that in order to be religious, one must engage in intuitive reasoning (at least to some degree) because the existence of God(s) or other supernatural entities is not observable, testable, or in any way

logically/experimentally deducible. The authors observed findings are further corroborated when one considers that religious involvement is vastly underrepresented within the scientific and academic communities; places where – at least traditionally - the burden of scientific and therefore testable or observable proof is essential (Bertsch & Pesta, 2009).

The third element Atran and Norenzayan (2004) outlined as being universally present in religious societies, is that supernatural agents function to assist individuals when confronted with common existential struggles. These struggles may include death, loneliness, catastrophe, pain, loss and injustice (Epley, Akalis, Waytz, & Cacioppo, 2008; Koenig, McGue, & Iacono, 2009). In an American article examining age relative to one's degree of religiosity, Arnett and Jensen (2002) note that emerging adulthood is - conceptually speaking - a relatively novel developmental period characterized by intense self-exploration. During this time, people are often grappling with uncertainties surrounding love, employment, self-development, and self-sufficiency or independence. One could quite easily argue that this is a developmental period both prone to, and potentially fraught with existential angst. Interestingly, the authors found that it is during this period (often when people are in their late 20's) that individual degree of religious involvement sharply *increases*. This increase is frequently observed after a significant decrease in self-rated religiosity during late teens and early twenties. Belief in a higher power can be both functional *and* adaptive in that this belief may provide one with a sense of purpose in and a model or direction for how to live their life as well as a framework for understanding death, loss, loneliness or suffering where perhaps there was none before (Exline, 2002; Ysseldyk, Matheson & Anisman, 2010). Taken together, these findings suggest, in accordance with Atran and Norenzayan's third definitional element of religion – that people often seek out religion to reduce existential angst(s).

The fourth element that Atran and Norenzayan (2004) included in their comprehensive definition is undoubtedly present or used predominantly as a definitional feature when referring to religion or religiosity throughout most empirical literature. For example, Zuckerman, Silberman and Hall (2013) noted that religiosity is often coded for elements such as frequency of church attendance and/or prayer, or participation and membership in a religious organization. Similarly, Holder, Coleman and Wallace (2010) used institutional religious rituals, practices and beliefs as the definitional criteria for religiosity. Ysseldyk, Matheson & Anisman (2010) also

approached religiosity from a social identity framework and therefore emphasize the rhythmic, sensory functions Atran and Norenzayan (2004) refer to in their definition.

To conclude, it is this author's opinion that the definition of religion provided by Atran and Norenzayan (2004) was comprehensive, highly representative and inclusive of empirical literature pertaining to the study of religion. It is remarkably versatile – yet specific - and therefore widely applicable to many religions, sects and/or faiths. Additionally, this definition leaves conceptual space where *spirituality* can be differentiated from religiosity in a way that does not disrupt or require changes to their original definition. For these reasons, this definition of religion has been selected and utilized for the current research. With this definition in mind, I will now examine how religiosity has historically been linked to intelligence.

Religiosity and Intelligence

As mentioned earlier, there have been many attempts to examine how religiosity might be related to intelligence (Zuckerman, Silberman & Hall, 2013). Regardless of the evident disunion surrounding the *definition* of religiosity, a negative relationship between these two variables has been the predominant consensus among recent empirical literature. Indeed, Francis (1998) notes that it is *more* difficult to find examples of positive correlations (i.e., as individual measures of intelligence increase, so too does religiosity) than the alternatives (i.e., a negative correlation or no relation between the variables). However, regardless of methodology, be it small-purposive sampling (e.g. Bertsch & Pesta, 2009) or large, random sampling (e.g. Lynn, Harvey & Nyborg, 2009), the trend towards a negative correlation between the two variables is dominant. I will now briefly outline two recent, widely-cited, relevant, and more notable studies in this area.

Lynn, Harvey and Nyborg (2009) conducted an expansive study in which they aimed to examine three research questions: Is there a negative correlation between religious belief and intelligence? Is the negative correlation psychometrically supported (e.g. by a "*g*-value")? And finally, whether this observed negative relationship persists between nations. The authors began their literature review by noting four empirically recurring points of evidence that support their hypothesized negative relationship: 1) The oft empirically observed negative correlation between religiosity and intelligence (historically this has been measured with a variety of inventories and varying methodological approaches), 2) Lower rates of religious endorsement among the educated elite versus the general population (e.g., Bertsch & Pesta, 2009; Hunsberger, 1978), 3)

A marked decline in religious belief as individuals transition from childhood to adolescence and, typically, as cognitive ability increases (Arnett & Jensen, 2002; Koenig, McGue, & Iacono, 2008), 4) As global intelligence increases throughout the 20th century (a well-known phenomenon termed the Flynn effect), there has been an accompanying general *decline* in religious belief. Given the author's research question regarding global religiosity and intelligence scores, how is such large-scale testing executed?

Lynn, Harvey and Nyborg (2009) utilized somewhat rudimentary g-factor score data previously obtained from the *National Longitudinal Study of Youth* as an indicator of intelligence. Conducted in 1997, this study employed a representative American sample of nearly 7000 participants, aged 12-17. Participants were also queried regarding their religious subscription. The authors found a significant difference between self-identified atheists and those who subscribed to a certain religion. Specifically, they observed a 6-point *g*-score advantage for atheists; a statistically significant difference. It is important however to understand that the authors only tested American 12-17 year-old participants. To test whether this observed trend in their data was also present internationally, the authors employed the use of additional previously collected data.

In conjunction with the scores listed above, Lynn, Harvey and Nyborg (2009) utilized *g*-scores obtained from Lynn & Vanhanen's (2006) study examining IQ by nation and combined that data with data published by Zuckerman (2007) pertaining solely to religiosity rates across 137 nations (i.e., 95% of the global population). Similar to previous empirical findings, Lynn, Harvey and Nyborg observed a negative relationship between *G* (an estimate of intelligence) and religious belief. That is, the authors observed a sizeable "correlation of -0.60 between national *g*-scores and disbelief in God" (p. 14).

There are methodological flaws in Lynn, Harvey and Nyborg's (2009) research. These include, but are not limited to the ambiguity surrounding participants' immigration or native nation status and definitions surrounding religiosity and how these might differ from country to country or religion to religion. However, the observed findings are still surprisingly congruent to previous studies devoid of these methodological pitfalls. To summarize and conclude, Lynn, Harvey and Nyborg were able to predict atheism rates across 137 nations using intelligence (*g*) scores. In accordance with these research findings, it appears certain individual characteristic

patterns of reasoning – which have also been linked to intelligence (Frederick, 2005; Toplack, West & Stanovich, 2011), may also be linked to the likelihood of one endorsing religious beliefs.

Religiosity and the Propensity to Engage in Certain Types of Cognitive Reasoning

In their comprehensive definition of religiosity, Atran and Norenzayan (2004) list elements that are common among all religions. Specifically, they note the presence of a counterintuitive and counterfactual belief in God(s). Centrally relevant to this specific aspect of their definition, Pennycook, et al. (2012) examined the relationship between individual religious and paranormal belief and how these both might be linked to individual characteristic cognitive styles of reasoning - among other variables.

As mentioned earlier, there are two main styles of cognitive reasoning; intuitive (Type 1) and analytic (Type 2). Intuitive reasoning is relatively quick, heuristic and/or unconscious. It could be described as going with one's "gut feeling." It could easily be argued that as one advances through traditional educational institutions (e.g., elementary school, secondary-school, post-secondary etc.) that both the content and workload within these institutions have a tendency to become increasingly demanding. Therefore, an educational environment progressively both favors and necessitates, at least to a small degree, that one engage in more reflective, deliberate, and effortful thought. The fact that certain individuals characteristically tend to favor or engage in one type of reasoning when confronted with problems of logic, such as base rate problems, is also well-established (Evans, 2008; Toplack, West, & Stanovich, 2011). For example, if it takes 10 machines 10 minutes to make 10 widgets, how long does it take 100 machines to make 100 widgets? The intuitive and incorrect answer is 100, but the correct, analytical response to this problem is 10. These elements comprise the basis of Pennycook, et al. (2012) research question: "Why do some people hold strong religious beliefs while others are quite dubious of them" (p. 336)?

Using numerous measures, Pennycook, et al. (2012) examined individual propensities to engage in certain styles of cognitive reasoning, their religious engagement, cognitive ability, education, political ideology, sex, and age. The authors observed significant negative correlations between all cognitive ability measures and religious belief. They also observed significant positive correlations between sex, conservative political ideologies and religious belief. Most relevant to this particular research however, they conclude by noting that the results

observed in their study suggest that two people similar in education, sex, political ideology, and cognitive abilities might differ on their level of religious engagement based solely on differences in individual thinking dispositions.

To conclude, recent research by Pennycook et al. (2012) not only lends empirical evidence to Atran and Norenzayan's (2004) second element common among all religions; a counterfactual and counterintuitive belief in God(s), their results and observations also contribute (albeit somewhat indirectly) to the largely predominant consensus that there *does* appear to be a negative correlation between religiosity and intelligence. As mentioned already, Zuckerman, Silberman, and Hall (2013) eloquently present a historical review on this topic if one is interested in exploring this specific area in further detail.

Although relevant to this area of research, the well-established negative correlation between intelligence and self-endorsed religiosity is not the *main* concern of this paper. Rather, it has been presented to frame another avenue for exploration, the question for this specific research: If the directionality between religiosity and intelligence is predominantly negative, what is the nature of the relationship between intelligence and *spirituality*? Before this question can be appropriately addressed - and much like religiosity - it is important that spirituality, yet another largely subjective, abstract and theoretical construct, be operationally defined.

Defining Spirituality

From a temporal perspective, spirituality has only been empirically studied as a theoretical construct *independent* of religiosity for approximately 5 decades (Gomez & Fisher, 2005; Hackney & Sanders, 2003). More specifically, the study of spirituality appears to have gained popularity among academic circles in the 1970's during the holistic health movement (Fisher, 1999). A lengthy search using two expansive online academic search engines (PsychInfo; OvidSP) suggested that there has been a somewhat recent resurgence in the empirical study of spirituality – especially towards the end of the 20th and beginning of the 21st century. Corroborating evidence comes from Steffen (2012) who analyzed this trend, noting that during the last 30 years there has been a significant increase in empirical research addressing spirituality, from approximately 200 studies in the 1960's, to nearly 7000 in the early 2000's. Despite this increase, it remains abundantly clear when reviewing current empirical literature that there is no consensual definition of spirituality (Miller & Thoresen, 2003). There are,

however, common themes evident in the plethora of definitions proposed, such as, belief system, interrelations, frame of reference and transcendence. Examining points of convergence and divergence between religiosity and spirituality is arguably an effective, pragmatic first step towards a consolidated definition. To reiterate, it is not this author's intention to shed any new definitional light on either of these constructs, yet it is still necessary to approach these definitions as pragmatically as possible to move forward with the current research.

When investigating religiosity and spirituality either independently or in juxtaposition to one another, concepts of belief, providing a frame of reference for one's life, as well as the idea of transcendental forces are concepts that appear often (Fisher, 1999; Mattis, 2000; Marler & Hadaway, 2003; Steffen, 2012). Perhaps a central difference among these supposed commonalities is one of *orientation*. That is, is one orienting themselves towards an entity or transcendental experience with an end goal in mind (e.g. salvation), or instead, for intrinsic value alone, such as the sense of satisfaction that can come from helping someone in need - or even both? The former might suggest a more religious individual orientation while the latter may be more aligned with current ideas surrounding spirituality.

A tangible and perhaps common point of divergence among spirituality and religiosity is the *institutional* focus of religiosity relative to spirituality. Indeed, Holder, Coleman and Wallace (2010) contrast the institutionalized practices, rituals and beliefs that might better characterize religiosity with their own concept of spirituality; an inner belief system that an individual might rely on for comfort. This definitional element of discrepancy often appears in relevant empirical literature with little variation and may perhaps be one of the only concrete differences (Bloodgood, Turnley, & Mudrack, 2008; Hackney & Sanders, 2003; Lun & Bond, 2013; Mattis, 2000; Steffen, 2012; Zullig, Ward, & Horn, 2006).

Given the highly subjective nature with which both which religiosity and spirituality are experienced and the difficulty defining either concept, the institutionalized nature of religion and assumed belief in a supernatural agent may indeed be the only tangible differences. Idler, et al. (2003) note that many (if not most) people have, at some point in their lives, experienced what could be considered a spiritual or transcendental experience. It is entirely possible that some individuals may have a spiritual experience, yet lack, nor desire a religion to ascribe said experience to. Now the definitional elements of spirituality utilized in the *Spiritual Well-Being Questionnai*re (SWBQ) for the current research will be presented.

The SWBQ, co-developed by Dr. John Fisher and Dr. Rapson Gomez has been extensively tested, normed, and is considered to be one of the most applicable and relevant individual measures of spirituality; it is, relatively devoid of, or confounded by religious under or overtones. In their review of prevalent multidimensional quantitative measures of spirituality, Meezenbroek et al. (2012) conclude that "Only the multidimensional Spiritual Well-Being Questionnaire (SWBQ) from Gomez and Fisher (2003) is promising. Its validity and reliability have been proven in student samples, most items are appropriately formulated, and it does not [necessarily] include well-being items" (p. 351). Because the SWBQ has been reviewed and deemed a preferred measure of spiritual well-being, it follows that the definitional components rather of spirituality originally put forth by Fisher (1998) in an unpublished doctoral dissertation, should be reviewed.

Within the SWBQ, spirituality is broadly referred to as: "…what lies at the heart of a human being." Spiritual health, an optional component within the questionnaire, is defined as: "…a measure of how good you feel about yourself, and how well you relate to those aspects of the world around you which are important to you." Fisher's (1998) definition of spirituality, or rather – definitional components of spirituality, are adopted and modified (slightly) from a somewhat dated definition. Working first with a definition of spirituality arrived at during the National Interfaith Coalition on Aging (1975), the four fundamental elements targeted within Fisher's (1999) SWBQ (also included in the latest version of the SWBQ used in this thesis) are: One's relation to the self, to others, to the environment, and to someone or something beyond the human level (i.e., transcendent being, force, God etc.). These definitional components are a minor deviation from the original components which, arguably consisted of stronger religious under and overtones; "…the affirmation of life in a relationship with God, self, community, and environment that nurtures and celebrates wholeness" (p. 30). Following a similar pattern, in an attempt to rid the SWBQ from religious connotations, the current version of the SWBQ replaces the words *Divine*, *God*, and the *Creator* (again, words with relatively strong religious over and undertones) with the word "Transcendent." In any case, the personal, communal, environmental and transcendent factors outlined in the current version of the SWBQ have been validated, normed and, as mentioned, this questionnaire has been independently deemed the best current measure of spirituality and spiritual well-being to date (Meezenbroek et al., 2012). The concept

of intelligence, how it can be measured and what these measurements could mean will now be approached briefly before methodology for the current study is outlined.

A Brief History and Definitions of Intelligence

At their most basic level, intelligence tests are used to quantify the somewhat abstract notion of intelligence. The quantification of intelligence can yield, among other important information – an IQ (intelligence quotient) – a normed measure of intelligence. These tests are commonly used to gain information about children, adolescents and adults in an attempt to guide efforts and resources to maximize chances of success (academic or other). An IQ score, in conjunction with other pertinent information about an individual's learning style (i.e., information gained through interviews, observation and informal assessment procedures) in the hands of a competent professional, can ultimately be used to gain a better understanding of how an individual learns, comprehends and processes information (Flanagan & Harrison, 2012). If there are discrepancies or patterns present in an individual's profile of learning strengths and weaknesses, specific accommodations and recommendations can be tailored to that individual to maximize their chances of success. But what does intelligence *mean*?

Much like religiosity and spirituality, there is well-documented history of ambiguity and debate surrounding the definition of intelligence (Sternberg, 1997). Although no single, consensual empirical definition of intelligence currently exists, some common elements include: one's ability to adapt to the environment, shape the environment, basic mental processes, and higher-order thinking such as problem-solving, decision-making, and reasoning (Flanagan & Harrison, 2012; Sattler, 2008; Sternberg, 1997). These elements appear often in slightly different arrangements. For example, in an article examining the knowns and unknowns regarding intelligence, Neisser et al. (1996) note "Individuals differ in their ability to understand complex ideas, to adapt effectively to the environment, to learn from experience, to engage in various forms of reasoning, to overcome obstacles by taking thought." (p. 77). In a chapter examining the history of intelligence testing and the ongoing debate surrounding this seemingly elusive definition, Sattler (2008) notes a conference in 1987 attended by over 1000 experts in the fields of psychology, sociology, genetics and education. Together, these specialists outlined 13 common elements of intelligence (listed in descending percentage order of agreement among those present): 1) abstract thinking or reasoning (99.3); 2) problem-solving ability (97.7); 3)

capacity to acquire knowledge (96); 4) memory (80.5); 5) adaptation to one's environment (77.2); 6) mental speed (71.7); 7) linguistic competence (71); 8) mathematical competence (67.9); 9) general knowledge (62.4); 10) creativity (59.6); 11) sensory acuity (24.4); 12) goal-directedness (24); 13) and achievement motivation (18.9). It is no coincidence that many current intelligence assessment tools in conjunction with behavioral measures, interviews and observations encompass – more or less – most all of these elements. It is somewhat perplexing that while no concrete definition of intelligence exists, there does appear to be a high-degree of consensus about what constitutes intelligence. Some early pioneers in the field of psychology and standardized intelligence testing include Alfred Binet, Lewis Terman and David Wechsler. They have each proposed definitions of intelligence and have had some role in the current understanding and quantification of intelligence today.

Alfred Binet defined intelligence as: "The tendency to take and maintain a definite direction; the capacity to make adaptations for the purpose of attaining a desired end; and the power of autocriticism" (Sattler, 2008, p. 223). Alfred Binet, with his colleague Theodore Simon, created the Binet-Simon Scale in France during the early 1900's to identify children in need of special education in order to maximize their chances of success in their respective educational environments. At this point in time, mental age (as opposed to a profile analysis or global IQ score) was the standard of measurement used (Cherry, 2014).

Lewis Terman, another influential individual in the field of intelligence testing, defined intelligence as the ability to carry out abstract thinking (Sattler, 2008, p. 223). As an additional contribution to the field of intelligence testing, Terman normed the aforementioned Binet-Simon scale on an American population in the early 1900's. To briefly clarify - norm-referenced measures refer to measures that are normed on a specific group (Flanagan & Harrison, 2012). Common characteristics of these specific groups often include: gender, age, ethnicity, educational background and even socioeconomic status in some cases. "The intent of a norm-referenced test is to provide a fair and equitable comparison of children [people] by providing objective, quantitative scores" (p. 5). In conjunction with scaling procedures used in the original Binet-Simon Scale, Terman derived a single measure of intelligence - the intelligence quotient (IQ), and renamed the Binet-Simon Scale to the Stanford-Binet Intelligence Test. This IQ score was derived using a conversion scale where mental age was scaled alongside chronological age. Although revisions have been made, this test is still in use today.

Finally, David Wechsler was an early proponent of the idea that intelligence is composed of many qualitatively different aspects or abilities. He defined intelligence as “the global capacity of a person to act purposefully, to think rationally, and to deal effectively with his environment" (Cherry, 2014). Wechsler developed a number of test inventories to be used with differently- aged groups, including the Wechsler Adult Intelligence Scale, the Wechsler Intelligence Scale for Children, and the Wechsler Preschool and Primary Test of Intelligence. Rather than scaling chronological age alongside mental age to arrive at an IQ score, Wechsler used normed performance of similar aged individuals to gain an average score for that specific age group. The average performance score was set at 100, with two-thirds of the population falling within one standard deviation of 15 points (i.e., between 85-115).

A properly administered and interpreted IQ measure is currently among the strongest predictors of educational attainment (Deary, 2001). Intelligence tests are predominantly utilized for three purposes: education, employment/hiring/screening, and medicine (Deary, 2001; Neisser et al., 1996). However, standardized tests are surrounded by controversy – particularly in cases when results from these tests are used to either compare groups of people, or when results can be used in a prescriptive capacity to limit an individual in some way (e.g. employment aptitudes/projected capabilities in an educational institution). In both cases, results from standardized measures often form the basis for potential life-altering decisions.

Another common criticism and inherent weakness of popular intelligence tests is that they are undeniably culturally-based (Sattler, 2008, Sternberg, 1997). That is, there are certain items and even domains on popular intelligence tests that are, at least to a degree - inherently grounded in culture, for example, inquiries based on units of measurement or proper etiquette in certain social situations. Although extensive efforts have been made to rid tests of their cultural-biases in order to maximize validity for as broad of a test population as possible, there are still items grounded, at least to some degree, in culture. As one can likely imagine, the danger lies in inaccurate or artificially suppressed scores due to information that may be culturally specific - not necessarily wrong. Sternberg (1997) describes this phenomena as a closed system; one in which what is considered correct or incorrect, intelligent or unintelligent is but a very narrow, specific and somewhat subjective margin.

Eloquently and relevantly mentioned in Jurassic Park, a movie where humans have genetically engineered dinosaurs back from extinction, the age-old critique of the human

condition with respect to innovation goes something like this: We as humans were so busy trying to discern whether we could, we never stopped to think whether we should. As it is, there is controversy surrounding the prescriptive and rigid nature of intelligence tests. Critics often scorn standardized measures of intelligence or achievement as labeling individuals or fostering limited views of individual human potential. This argument is relatively mute though when standardized tests are compared to their alternatives, which are almost all grounded in subjectivity (Sattler, 2008). For example, examining student portfolios across time, presentations, exhibitions or demonstrations of learning by the student in question as a means of assessing performance. While undoubtedly useful, there is an inherent level of subjectivity present when interpreting/scoring these latter standardized test alternatives. Because standardized tests of intelligence yield valid, reliable and objective statistical measures of different abilities thought to contribute to overall intelligence, such as verbal comprehension, perceptual reasoning, working memory and processing speed, access to services through diagnoses of intellectual disabilities or learning disorders most often require standardized tests of cognitive abilities as part of the diagnostic procedure. Subjective measures of these factors would make accurate diagnoses and ultimately – individual access to appropriate remedial supports or services more difficult to accurately administer.

Intelligence is arguably one of the most widely-studied constructs within the discipline of psychology (Flanagan & Harrison, 2012). This is at least partially due to the emphasis society places on one's IQ. Diagnoses, labels, and the stigma that may ensue are often cited by critics of intelligence tests. Likewise, the limiting potential that can be associated with a deviation, either high or low, from the norm can also become problematic. Compared to alternatives though (e.g. subjective methods of assessment), the information yielded by intelligence tests in the hands of trained professionals can be utilized to help individuals achieve to their highest potential. Therefore, regarding intelligence tests, it is clear that the potential positives outweigh the potential drawbacks.

Intelligence and the Current Research

In addition to being used as a benchmark, continuous, relational measure against a host of other variables such as happiness, problem-solving abilities and common health-factors, intelligence has historically been studied as a variable in relation to self-endorsed religiosity for

nearly a century now. Because of the somewhat ambiguous and highly-contested nature of the relationship between religiosity and spirituality, intelligence can yet again be utilized in the current research as a benchmark to examine the nature of the relationship between *spirituality* and intelligence. Is the same negative relation between intelligence and self-endorsed religiosity present when examining intelligence relative to self-endorsed *spirituality*?

For the current exploratory research, as mentioned, overall cognitive ability scores will be examined alongside scores on the SWBQ to examine if a relationship between overall cognitive ability and measures on the SWBQ exists. As mentioned earlier, empirical examinations of religiosity relative to intelligence have yielded results indicating a significant negative relation between the two variables. It is important to note, however, that there are undoubtedly many aspects of a person's being that cannot be measured through popular intelligence inventories and intelligence is but only one aspect of person.

CHAPTER 3: METHODOLOGY

Historically, spirituality and religiosity were empirically examined as a unitary concept; often as religiosity - where either spirituality or religiosity could be assumed by the other. There has been a pronounced paradigm and methodological shift during the past three or four decades where spirituality and religiosity are now often studied empirically as separate constructs. In this chapter of the document, detailed information will be provided concerning the participant sample, research methodology and materials used to gather necessary information as well as the statistical analyses utilized to examine data that was collected.

Participants

For the current study, 50 volunteer undergraduate students from the University of Saskatchewan Psychology Participant Pool were recruited. These students participated for optional course credit in their introductory psychology course. For the sake of homogeneity of the test sample, and, given the previously mentioned impact culture, ethnicity and language can have on both standardized tests of intelligence as well as measures of spirituality and religiosity, only data from student participants who speak English as a first language was included in the analyses.

One participant did not provide an age at the time of testing, and, consequently, a normed estimate of intelligence is impossible to generate. Therefore, this participant was not included in any analyses. Additionally, one participant's intelligence composite score fell more than two standard deviations below the mean. It is clear that either this participant did not understand the instructions provided, they did not read the questions, circled random answers, or experienced unusual levels of difficulty with both the verbal and abstraction subtests that comprise the Shipley-2 assessment of cognitive ability. Therefore, results from this participant were not included in analyses. Four participants listed a language other than English as their first language. Data from these participants were not included in analyses. After these necessary participant exclusions, 44 participants (32 female, 12 male) were included in final analyses. Overall, the included sample's ages ranged from 18 to 36 (18-30 for female and 19-36 for male). Mean age for the entire sample was 20.6 years old (19.8 for female and 22.6 for male) while both the median and mode are 19 years old.

Materials

Participants were required to list standard demographic information such as sex, age and first language on the Shipley-2 form in the appropriately labeled spaces. Although participants were also instructed to list the number of years they had been enrolled in post-secondary education and their primary area of study (major, if declared), very few actually provided this information, so it was not included in analyses. Participants were then administered two paper and pencil tasks in a group setting - which they were required to complete individually.

Shipley-2

The Shipley-2 is an abbreviated test of cognitive ability that provides examiners with a reliable and valid measure of intelligence (Shipley, Christian, Martin, & Klein, 2009). This test contains two scales; verbal and abstract reasoning. The vocabulary subtest measures crystallized intelligence. Crystallized intelligence refers to one's ability to utilize previously learned or existing knowledge to solve problems. This form of intelligence is strongly linked to vocabulary skills, which can be bolstered throughout one's lifetime and is largely influenced by exposure to literature. The abstraction subtest is a measure of fluid intelligence. This conceptually separate form of intelligence is thought to be utilized when working with novel problems or situations (Flanagan & Harrison, 2012). Like most modern tools designed to yield an estimate of intelligence, the Shipley-2 has been standardized to a mean of 100 and a standard deviation of 15. It takes approximately 20 minutes to complete

Spiritual Well-Being Questionnaire (SWBQ)

The Spiritual Well-Being Questionnaire (SWBQ) was utilized to assess participant's self-perceived spirituality (Gomez & Fisher, 2003). This questionnaire hinges on previous research conducted by Fisher (1999) and, according to Holder, Coleman and Wallace (2010), probes each of his proposed four dimensions of spiritual health: (1) personal (meaning in value in one's own life); (2) communal (quality and depth of inter-personal relationships); (3) environmental (sense of awe for nature); (4) transcendental (faith in and relationship with something or someone beyond the human level). The SWBQ takes approximately 20 minutes to complete. In a recent meta-analysis of various inventories that claim to measure spirituality as a separate construct from religiosity, the SWBQ was found to have high internal consistency, validity, and, to

conclude - is the preferred inventory when gathering individual, subjective measures of spirituality (Meezenbroek et al., 2012).

Procedure

All participants were tested in a quiet, large and well-lit room. Consent forms were initially administered to participants and they were encouraged to ask questions prior to any inventory administration. After informed consent had been received from all participants, they were instructed to complete the demographic, language and post-secondary school queries before starting either of the inventories. Thorough written instructions for each task were included at the beginning. If participants had any further inquiries, they were permitted to ask at any point. To control for practice effects, the order with which the SWBQ and Shipley-2 inventories were presented was alternated for each participant such that half the participants completed the SWBQ before the Shipley-2. Once all sections of the study were complete, participants were provided with a debriefing form explaining the purpose of the study and, again, given an opportunity to ask any questions. Researcher contact information was made available in cases where the participants may have had any questions or concerns at a later time.

Analyses

Kendall's tau-b correlational procedure will be utilized to examine the nature and strength of the relationships between all variables of interest.

Hypotheses

In chapter one, Holder, Coleman, and Wallace's (2010) statement that there are essentially four categories of individual spirituality and religiosity that are, in theory, all encompassing was presented. To reiterate; it is possible for one to be neither spiritual nor religious, spiritual but not religious, religious but not spiritual or religious *and* spiritual. If one considers not only the overwhelming majority of research where a negative correlation between self-rated religiosity and intelligence has been observed, but also published findings by Pennycook et al. (2012); that as one's self-rated belief in supernatural agents increases, so too does one's propensity to engage in intuitive rather than analytic reasoning, it follows that as one moves up this conceptual matrix presented, in a specific order, by Holder, Coleman, and Wallace

(2010), the likelihood or propensity to engage in intuitive reasoning also increases. The research question is: Given the historically robust negative correlation between self-rated religiosity and intelligence, what is the nature of the relationship between intelligence and self-rated *spirituality*?

Relative to ideas more closely associated with 'spirituality,' it takes an *increased* willingness to suspend logic to subscribe or fall within the realm of religious. As mentioned previously, tests of cognitive ability tend to favor those who characteristically engage in an analytical style of reasoning over those who characteristically reason intuitively (i.e., with their gut-feelings). It is hypothesized that as individuals move on an imagined spectrum from no belief to spirituality exclusively (e.g., non-religious Buddhist practitioners) and finally, transition towards religiosity their propensity to accept or rely on information in the absence of fact or proof also increases. Thus, imagined along a continuum which is presented in Figure 1, these individuals would be more likely to reason intuitively relative to their atheist counterparts and deflated scores on inventories designed to provide an estimate of intelligence will consequently be observed.

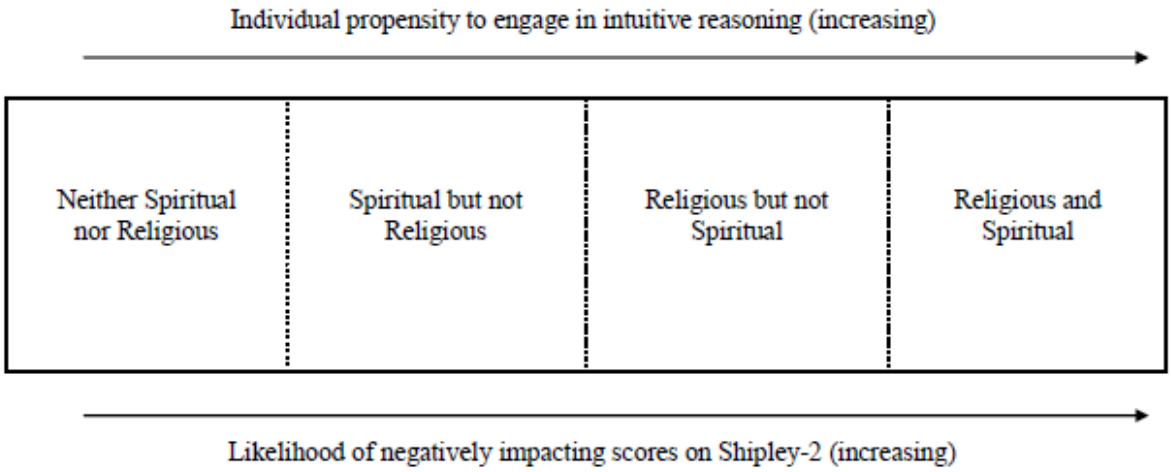

Figure 1. Individual propensity to engage in intuitive reasoning increases as an individual moves from being neither spiritual *nor* religious to religious *and* spiritual. The likelihood of negatively impacting scores on Shipley-2 increases in this same direction. Note: Categories are made intentionally rigid/equal to aid in conceptualization.

As mentioned, one can utilize global individual spirituality scores (the cumulative score of all items within the SWBQ) or examine any of the four probed components separately. They are: personal, communal, environmental and transcendental. It is hypothesized that the strongest negative relationship will be observed when examining intelligence relative to the summary score for items probing *only* the transcendental component of the SWBQ. Belief in a transcendent or supernatural being requires one to suspend logic. Furthermore, people tend to characteristically engage in a specific form of reasoning – either intuitive or analytical. Generally, the Shipley-2, like any reputable test of cognitive abilities, would favor those who approach test items from an analytic problem-solving approach. For these reasons, the negative correlational relationship between observed individual scores of intelligence relative to cumulative scores on items probing only the transcendental component of SWBQ should be relatively strong.

Gomez and Fisher (2003) administered the SWBQ to a large sample of university students. Observed scores for the transcendental factor were most strongly correlated with the personal factor of the SWBQ. Due to the demographic similarity of the experimental sample in Gomez and Fisher's (2003) study and the previously mentioned, hypothesized relationship between the transcendental factor of the SWBQ and Shipley-2 measures of cognitive ability, it is also possible that individual scores on the personal factor may be strongly correlated with scores of cognitive ability on the Shipley-2.

When examined separately, it is hypothesized that the subjective strength of one's spiritual connectedness to the environment will be relatively weakly correlated or not predictive of the composite estimate of cognitive abilities on the Shipley-2. Unlike observed scores probing one's spiritual connectedness with the transcendent factor of the SWBQ, it is not clear how one's subjective feeling of oneness with the environment might influence or be related to their propensity to reason and thus – influence scores on the Shipley-2. However, it is possible that observed scores on items probing the communal component of spirituality will be somewhat predictive of one's cognitive ability. Items probing the communal component of the SWBQ such as: respect for others or kindness towards others, are common teachings amongst many religions. Also, a sense of community has already been listed as a somewhat implicit function of most organized religions. It is possible then that the communal aspect of the SWBQ may inherently be confounded by religious undertones. That is, observed scores on items probing the communal

factor of the SWBQ could actually be indirectly assessing one's religiosity. If this is indeed the case, one would expect a negative relationship between any measures of intelligence and cumulative scores on items probing the communal factor on the SWBQ.

Finally, past research by Gomez and Fisher (2003) established a relatively weak correlation between individual cumulative scores on the communal and transcendental factors. Based on their research with university students, cumulative scores on items probing the communal factor of the SWBQ are most highly correlated with cumulative scores on items probing the environmental factor. For this reason, it is possible that if observed scores on items probing the communal factor are moderately predictive of one's estimate of cognitive abilities, scores probing the environmental factor may also be predictive of cognitive abilities; albeit to a lesser degree.

Relative to individual scores on both the Vocabulary subtest and the overall composite estimate of cognitive abilities, it is hypothesized that observed scores on the Abstraction component of the Shipley-2 will be more predictive and strongly correlated to global measures of spirituality, but will follow the same general pattern when concerning the separate factors within the SWBQ as outlined above. When dealing with highly abstract concepts, such as spirituality and, especially, transcendental forces, one's propensity and perhaps - ability to engage in problem-solving or analytic reasoning will impact measures on the SWBQ more than items that probe crystallized intelligence; vocabulary and existing knowledge.

In addition to being analyzed as a whole sample, the participant sample will be broken into two groups based on age. Fifty-nine percent (n=26) of the participant sample was either 18 or 19 years old. The remaining 41% (n=18) were aged 20-36. Additionally, the median and the mode for the current sample of participants is 19. All analyses that were performed on the sample as a whole will be repeated on these two, separate groups to see if age mediates observed results. Past research has linked age to increased individual religious endorsement (Arnett & Jensen, 2002). Specifically, as one moves from their late teens to late 20's, there is a trend towards individual increase in self-rated religiosity. Therefore, it is possible that inflated scores on the transcendental component of the SWBQ will be observed amongst the older age group. Inflated scores on the SWBQ among the older age group could then be accompanied by deflated scores on Shipley-2 measures.

Finally, there are two items at the end of the SWBQ that probe subjective importance of religion and spirituality. It is likely that those who rate religion as being important will also fall higher along the continuum of religiosity or, put another way – religiousness. Past research would suggest that Shipley-2 results, in turn, will be deflated as one moves up the conceptual matrix of spirituality and religiosity as presented earlier in Figure 1.

CHAPTER 4: RESULTS

In this chapter, descriptive statistics will be presented first, followed by preliminary analyses and finally, inferential statistics. Results will be interpreted, discussed, implications will be outlined and directions for future research will be presented in Chapter five.

Demographic Information

Fifty undergraduate students were recruited from the University of Saskatchewan's Psychology Participant Pool. After removing six participants from the sample due to missing data, English listed as an additional language or an observed score on the Shipley-2 that fell more than two standard deviations below the norm, 44 participants (12 male, 32 female) were included in the final analyses.

Of the participants who were included in the final analyses, 26 were either 18 or 19 years-old and the remaining 18 participants were between 20 and 36 years-old. All 44 participants listed English as their first language. For the purposes of this study, a younger age group was created based on the fact that 59% of the sample was clustered within the 18 to 19 year-old category, whereas, the remaining sample was viewed as the older age group but contained a wider spread in ages. It is recognized that this somewhat artificial sub-grouping of the data set was used to determine if differential response patterns could be observed on both the Shipley-2 and the SWBQ based on these two age-based groups. However, subsequent analysis and conclusion based on these intergroup comparisons are not meant to be generalized beyond the scope of this particular data set.

Descriptive Statistics

The following section outlines descriptive information that was collected for all 44 participants on both the Shipley-2 and the SWBQ.

Shipley-2

The Shipley-2 yields a single, numerical composite score that represents an overall estimate of individual cognitive ability or intelligence. This composite score is generated by using the individual's age as well as raw and scaled scores on the Vocabulary and Abstraction

subtests that comprise the Shipley-2. Table 1 summarizes the means and standard deviations for the entire sample as well as males and females separately.

Table 1.

Means and (Standard Deviations) on Shipley-2 Scaled Scores[1]

Shipley-2	Male (N=12)	Female (N=32)	Combined (N=44)
Vocabulary	102.2 (9.5)	103.6 (10.0)	103.2 (9.8)
Abstraction	107.4 (10.6)	105.6 (8.7)	106.1 (9.2)
Composite Score	106.8 (8.1)	106.6 (9.0)	106.7 (8.7)

Note. Standard Scores have a Mean = 100 and Standard Deviation = 15.

SWBQ

The SWBQ is comprised of 20 questions with each response rated on a likert scale ranging from 1 (very low) to 5 (very high). Cumulative self-report scores on the SWBQ (overall spirituality) can therefore range from 20 (a general indication of a very low-level self-perceived spirituality) to 100 (a very high-level of self-perceived spirituality). Personal, Communal, Environmental and Transcendental factors that, when summed, comprise the cumulative score on the SWBQ, are probed with five questions each. Therefore, when examining the factors that comprise the SWBQ, scores on each of the aforementioned factors can range from 5 (a general indication of a very low-level self-perceived spirituality for that specific factor) to 20 (a very high-level of self-perceived spirituality in that specific area). Finally, the subjective importance of both religion *and* spirituality were rated separately on the same 5-point likert scale. Therefore, observed scores on importance of religion and spirituality can range from 1 (a general indication of a very low perceived importance) to 5 (a general indication of a very high perceived importance). Table 2 summarizes the means and standard deviations for the entire sample as well as males and females separately.

Table 2.

Means and (Standard Deviations) on SWBQ

SWBQ Factor	Male (N=12)	Female (N=32)	Combined (N=44)
Personal	19.7 (3.2)	19.8 (3.6)	19.8 (3.5)
Communal	20.2 (3.6)	20.2 (2.8)	20.2 (3.0)
Environmental	17.3 (2.6)	16.4 (3.8)	16.7 (3.5)
Transcendental	13.2 (6.0)	13.0 (5.7)	13.1 (5.7)
Overall	71.3 (10.6)	69.5 (11.9)	70.0 (11.5)
Religion Importance	2.7(1.6)	2.3 (1.4)	2.4 (1.4)
Spirituality Importance	3.2(1.6)	3.5 (1.0)	3.4 (1.2)

Preliminary Analyses

An assessment of the normality of data distribution is necessary to determine which statistical procedures are appropriate to perform with an observed data set. In order to utilize a Pearson product-moment correlation coefficient, a normal distribution of data (among other factors, such as linearity and homoscedasticity) must be observed. Pallant (2010) noted that the Kolmogorov-Smirnov statistic assesses the normality of a distribution. Table 3 illustrates that, with the exception of the overall intelligence composite, overall spirituality composite, communal spirituality factor and transcendent spirituality, data for all other variables violate the assumption of normality.

Table 3.

Kolmogorov-Smirnov Test for Normality[1]

Distribution	Significance Value
Vocabulary Standard Score	.040
Abstraction Standard Score	.001
Overall Intelligence Composite	.200*
Overall Spirituality	.200*
Personal Spirituality	.037
Communal Spirituality	.200*
Environmental Spirituality	.006
Transcendent Spirituality	.200*
Religious Importance	.000
Spirituality Importance	.000

Note[1]. *Indicates normality

According to Pallant (2010), skewness refers to the symmetry of a distribution of continuous data, while kurtosis provides information about the way the data peaks. Positive skewness refers to data that clusters towards the left of the distribution and negative skewness refers to data that clusters towards the right. Positive kurtosis values indicate that data is peaked, or that the data is clustered towards the middle of the distribution, while negative kurtosis values indicate that the distribution is flat and therefore, data is distributed evenly. Skewness and kurtosis values of zero would indicate a perfect, normal distribution, suitable for parametric statistical analyses. Table 4 illustrates skewness and kurtosis values for the current data, while Figures 2 and 3 illustrate the distribution of data for the two main variables of interest. Unfortunately, the majority of data is skewed with either high or low kurtosis. Also, much of the data is not distributed normally and therefore, a non-parametric statistical analytic procedure was utilized in place of the Pearson product-moment procedure.

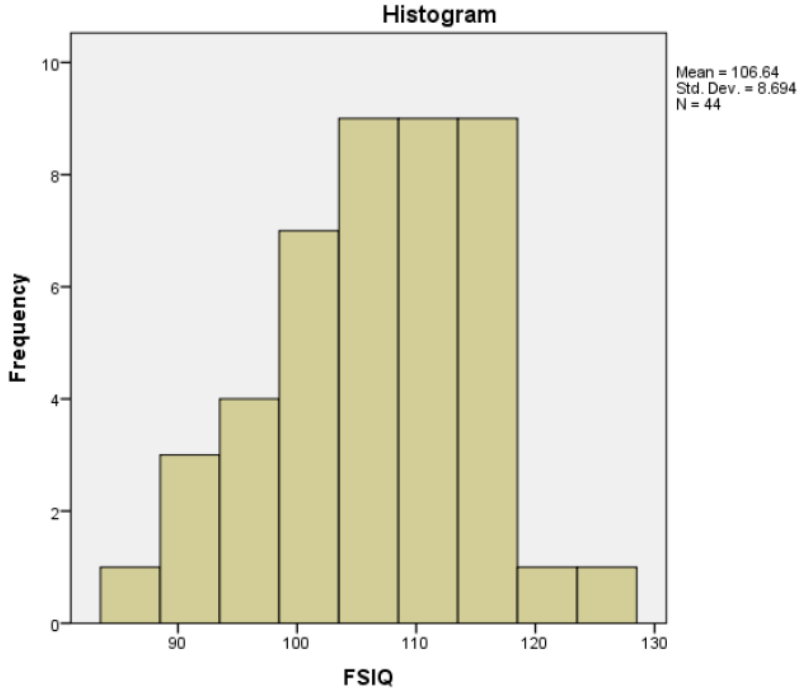

Figure 2. The distribution of observed overall intelligence (FSIQ) scores.

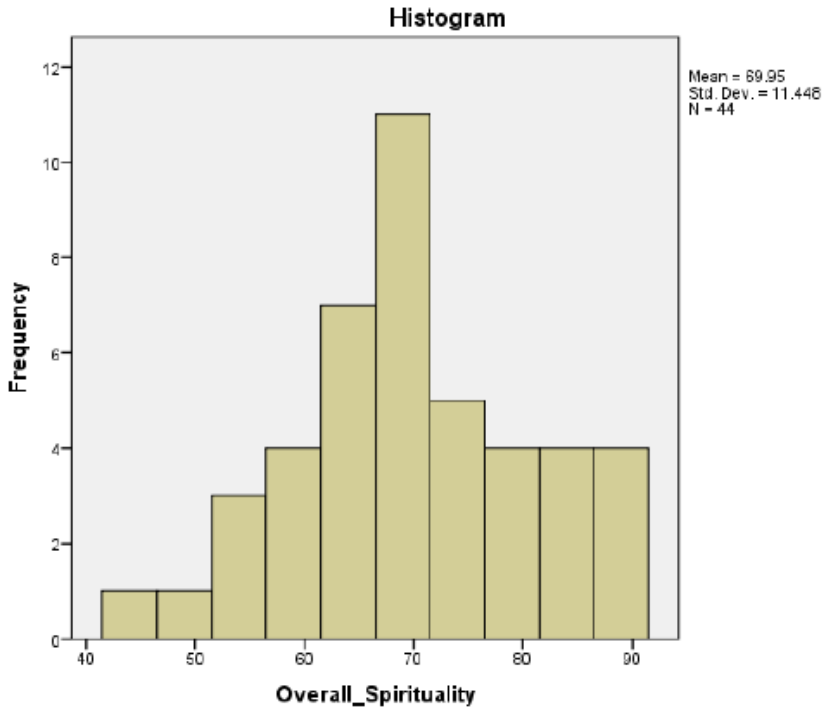

Figure 3. The distribution of observed overall spirituality scores.

Table 4.

Skewness and Kurtosis Values for Distributions

Distribution	Skewness	Kurtosis
Vocabulary Standard Score	-.198	-1.001
Abstraction Standard Score	-.583	.646
Overall Intelligence Composite	-.337	-.387
Overall Spirituality	.026	-.478
Personal Spirituality	-.594	.506
Communal Spirituality	-.196	-.628
Environmental Spirituality	-.703	-.063
Transcendent Spirituality	.337	-.590
Religious Importance	.551	-1.035
Spirituality Importance	-.305	-.812

Inferential Statistics

Field (2013) lists Kendall's tau-b (τ) as a suitable non-parametric alternative that can be utilized with small sample sizes to yield a correlation coefficient much like a Pearson product-moment correlation coefficient. As such, this calculation will yield a correlation coefficient (i.e., a τ -value) that can theoretically range from -1.00 (an indication of a perfect negative correlation - as the observed value of one continuous measure fluctuates, the other value fluctuates at the same rate but in the opposite direction), 0 (no correlation – value fluctuations on one measure are not related to value fluctuations on another) to +1.00 (an indication of a perfect positive correlation - as the observed value of one continuous measure fluctuates, the other value fluctuates at the same rate and in the same direction). According to Pallant (2010), correlation coefficients ranging from 0.1-0.29; 0.3-0.49; and 0.5-1.0 qualitatively correspond to small, medium and large correlation effect sizes, respectively.

Kendall's tau-b statistical analytic procedure enabled an examination of the strength and directionality of the relationships between measures on the Shipley-2 and SWBQ. That is, overall cognitive ability as well as vocabulary and abstraction standard scores were analyzed in

relation to the separate contributory factors of spirituality; the personal, communal, environmental and transcendental components that factor into the overall composite measure of one's spirituality. The relationship of overall cognitive ability and its constituents were also analyzed alongside the single, subjective and continuous measures of the respective importance of religion and spirituality.

In addition to examining the relationship between the main variables of interest (i.e., overall cognitive ability, vocabulary and abstraction subtest scaled scores, overall spirituality, the personal, communal, environmental and transcendent factor scores, and, religious and spiritual importance scores), all analyses were repeated with the constructed age groups to examine how age impacted observed scores on all measures. Finally, given the largely unequal distribution of males and females in this particular participant sample, the non-parametric nature of the collected data, and that gender is a nominal, or categorically discrete grouping, comparing study results based on gender is not appropriate with this particular participant sample.

Shipley-2 in relation to the SWBQ

The relationship between overall cognitive ability and overall spirituality, as measured by the Shipley-2 and SWBQ, respectively, was investigated using Kendall's tau-b correlation analysis procedure. There was a small, negative correlation between the two variables, $\tau = -.23$, $n = 44$, $p < .05$, with higher levels of cognitive ability associated with lower levels of self-rated spirituality. A negative, medium-sized correlation observed between overall cognitive ability and the transcendent factor of spirituality, $\tau = -.37$, $n = 44$, $p < .001$, with higher levels of cognitive ability associated with lower levels of self-rated spirituality on the transcendent factor of spirituality specifically. A small, negative correlation was also observed between the abstraction standard score and the transcendent factor of spirituality, $\tau = -.29$, $n = 44$, $p < .05$, with higher observed abstraction abilities, as measured by the Shipley-2, associated with lower scores on the transcendent factor of spirituality.

While a negative correlation was observed between vocabulary standard score and the transcendent factor of spirituality as well as between abstraction standard score and overall spirituality, the relationships were not significant relative to the necessary alpha level of .05. Observed p-values are less than .1 and, as such, these relationships are only *approaching* significance and should be interpreted with caution. A small, negative correlation between

vocabulary standard score and the transcendent factor of spirituality was observed, $\tau = -.21$, $n = 44$, $p < .10$, with higher vocabulary ability associated with lower scores on the transcendent factor of spirituality. Also, a small, negative correlation was observed between abstraction standard score and overall spirituality, $\tau = -.21$, $n = 44$, $p < .10$, with higher observed abstraction abilities associated with lower levels of overall spirituality. Table 5 summarizes the correlation data presented thus far.

Table 5.

Kendall's tau-b Correlations between Shipley-2 and SWBQ Measures

SWBQ	Overall Cognitive Ability	Vocabulary SS	Abstraction SS
Overall Spirituality	-.228*	-.145	-.212
Personal Spirituality	-.174	-.130	-.172
Communal Spirituality	.019	-.030	.007
Environmental Spirituality	-.012	.047	-.059
Transcendental Spirituality	-.370**	-.205	-.292*
Religion Importance	-.259*	-.145	-.178
Spiritual Importance	-.255*	-.180	-.166

Note.* Correlation is significant at the .05 (2-tailed) level

**Correlation is significant at the .001 (2-tailed) level

Religious and Spiritual Importance

Subjective measures for spiritual and religion importance were probed separately. There was a small, negative correlation between overall intelligence and religious importance, $\tau = -.26$, $n = 44$, $p < .05$, with higher levels of cognitive ability associated with lower levels of self-rated religious importance. A small, negative correlation was also observed between overall cognitive ability and the spiritual importance, $\tau = -.26$, $n = 44$, $p < .05$, with higher levels of cognitive ability associated with lower levels of self-rated spiritual importance. In this particular sample of participants, cognitive ability predicted identical levels of individual, self-rated religion *and* spiritual importance.

A small, positive correlation was observed between subjective ratings of religious importance and overall spirituality, $\tau = .25$, $n = 44$, $p < .05$, with higher levels of religious importance associated with higher levels of overall spirituality. A medium-sized, positive correlation was also observed between subjective spiritual importance and overall spirituality, $\tau = .41$, $n = 44$, $p < .001$, with higher levels of subjective spiritual importance associated with higher levels of overall spirituality. Predictably, the link between the subjective importance of spirituality was more strongly related to overall spirituality than subjective importance of religion.

The transcendent factor of spirituality was the only individual factor of spirituality for which a significant correlation was observed between the religious and spiritual importance items. A large, positive correlation was observed between subjective ratings of the importance of religion in one's life and observed ratings on the transcendent factor of spirituality, $\tau = .6$, $n = 44$, $p < .001$, with higher levels of religious importance associated with higher subjective ratings on the transcendent factor of spirituality. A medium-sized, positive correlation was observed between subjective ratings of the importance of spirituality in one's life and observed ratings on the transcendent factor of spirituality, $\tau = .48$, $n = 44$, $p < .001$, with higher levels of spiritual importance associated with higher subjective ratings on the transcendent factor of spirituality. Among this particular participant group, subjective ratings of *religious* importance are more predictive of scores on the transcendent factor of spirituality than the importance of *spirituality* in one's life.

Finally, a medium-sized, positive correlation was observed between subjective ratings of the importance of religion and subjective ratings of the importance of spirituality, $\tau = .32$, $n = 44$, $p < .05$, with higher levels of self-rated spirituality importance associated with higher levels of religion importance. Refer back to Table 5 for religious and spiritual importance correlation data.

Correlations within the Shipley-2 and SWBQ

Table 6 clearly illustrates that all four factors of the SWBQ were consistently and relatively uniformly correlated with the overall spirituality measure. That is, all correlations were large, significant at the $p < .001$ level and ranged from .51 to .59. Aside from a large, positive correlation between the transcendent factor of spirituality and the overall composite measure of spirituality, $\tau = .52$, $n = 44$, $p < .001$, all other factors of spirituality (i.e., personal, communal and

environmental) exhibited weak, non-significant relationships with the transcendental factor. A discussion surrounding the observed patterns of correlations will occur in Chapter 5.

Table 6.

Kendall's tau-b Correlations Between SWBQ Measures

SWBQ	O[1]	P[1]	C[1]	E[1]	T[1]	RI[1]	SI[1]
Overall Spirituality	1.00	.587**	.509**	.561**	.520**	.245*	.407**
Personal Spirituality	.587**	1.00	.482**	.431**	.198	.019	.213
Communal Spirituality	.509**	.482**	1.00	.369**	.118	-.041	.107
Environmental Spirituality	.561**	.431**	.369**	1.00	.177	.030	.218
Transcendental Spirituality	.520**	.198	.118	.177	1.00	.595**	.481**
Religion Importance	.245*	.019	-.041	.030	.595**	1.00	.321*
Spiritual Importance	.407**	.213	.107	.218	.481**	.321*	1.00

Note.[1] O = Overall Spirituality; P = Personal Spirituality; C = Communal Spirituality; E = Environmental Spirituality; T = Transcendental Spirituality; RI = Religion Importance; SI = Spiritual Importance

* Correlation is significant at the <.05 (2-tailed) level

**Correlation is significant at the ≤.001 (2-tailed) level

Correlations within the Shipley-2 indicate that standard score results on the vocabulary and abstraction components were both highly predictive of one's overall cognitive ability, with vocabulary having slightly higher predictive (correlation) strength than abstraction, $\tau = .63$, $n = 44$, $p < .001$ and $\tau = .55$, $n = 44$, $p < .001$, respectively. As standard scores on the vocabulary and abstraction components of the Shipley-2 increased, so too did overall cognitive ability scores. A weak, non-significant correlation was observed between standard scores on the abstraction and vocabulary components, indicating that each respective measure is indeed loading onto a unique form of cognition (i.e., fluid and crystallized intelligence, respectively). These correlations are presented in Table 7.

Table 7.

Kendall's tau-b Correlations Within the Shipley-2

Shipley-2 Measures	Overall Cognitive Ability	Vocabulary SS[1]	Abstraction SS[1]
Overall Cognitive Ability	1.00	.633**	.545**
Vocabulary SS	.633**	1.00	.130
Abstraction SS	.545**	.130	1.00

Note.[1] SS = Standard Score

* Correlation is significant at the <.05 (2-tailed) level

**Correlation is significant at the ≤.001 (2-tailed) level

Age as a factor

Table 8 illustrates that no significant correlations between any of the key intelligence or spirituality variables of interest and age were observed.

Table 8.

Kendall's tau-b Correlations Between Age and SWBQ and Shipley-2 Factors

Study Variables	OI[1]	VocSS[1]	AbsSS[1]	OS[1]	P[1]	C[1]	E[1]	T[1]	RI[1]	SI[1]
Age	.028	.116	-.100	.071	.107	.155	.081	-.086	-.149	.052

Note.[1] OI = Overall Intelligence; VocSS = Vocabulary Standard Score; AbsSS = Abstraction Standard Score; OS = Overall Spirituality; P = Personal Spirituality; C = Communal Spirituality; E = Environmental Spirituality; T = Transcendental Spirituality; RI = Religion Importance; SI = Spiritual Importance

* Correlation is significant at the <.05 (2-tailed) level

**Correlation is significant at the ≤.001 (2-tailed) level

Throughout Chapter four, demographic information for all 44 included participants was presented. Fifty participants were sampled, but six did not meet inclusion criteria. Male, female and whole sample descriptive statistics were presented for the Shipley-2 and SWBQ. Although

male and female data were presented separately, preliminary analyses revealed that due to the observed distribution characteristics of the data and uneven number of male and female participants, Kendall's tau-b, non-parametric correlation procedure would only be appropriate to examine the participant sample as a whole.

Summary

Significant, negative correlations were observed between Shipley-2 measures of cognitive ability and SWBQ measures. That is, significant negative relationships were observed between overall cognitive ability and overall spirituality as well as the transcendent factor of the SWBQ. A significant negative relationship was also observed between abstraction standard score and the transcendent factor of the SWBQ. Finally, both religious and spiritual importance measures were negatively correlated with overall intelligence and positively correlated with overall spirituality. Tangential relationships observed within the SWBQ and Shipley-2 were also reported. An interpretation and discussion of the results, followed by directions for future research will now be presented in Chapter five.

Chapter 5: Discussion

Currently, there is no empirical research wherein the relationship between an empirically supported, individually administered, self-rated measure of spirituality is examined alongside an individual standardized estimate of intelligence. This exploratory research was conducted to answer a research question: Given the historically robust negative correlation between self-rated religiosity and intelligence, what is the nature of the relationship between intelligence and self-rated spirituality?

As mentioned in Chapters 1 and 2, empirical research dating back to as early as the 1920's has established a widespread and robust negative correlation between various measures of intelligence alongside various measures of religiosity. In line with the historical holistic health movement of the 1970's, Berry (2005) proposed guidelines for future research concerning religiosity and spirituality. Among other suggestions, he outlined the need for future research to refer to and examine religiosity and spirituality as separate concepts.

Due to the small sample size, the non-parametric nature and observed distribution characteristics of the collected data, Kendall's tau-b statistical analytic procedure was utilized to enable an examination of the strength and directionality of the relationship between measures on the Shipley-2 and SWBQ. Although it was initially outlined as an additional variable of particular interest and relevance to this particular research, gender is a nominal or categorically discrete grouping and therefore, comparing study results based on gender was deemed not appropriate with this particular participant sample. Age was initially outlined as another variable of interest, but no significant results were observed for any study variables based on age. This was likely due to the arbitrary age groupings. That is, the relatively narrow 18-19 year-old age grouping comprised over half of the entire sample, while the relatively broad 20-36 year-old age grouping comprised the remainder of the sample.

A discussion surrounding the results of this particular study and how they may relate to past research will be followed by the presentation of some limitations and possible avenues for future research.

The Big Question: How do Measures of Intelligence and Spirituality Relate?

Given the well-established negative relationship between intelligence and self-endorsed religiosity, as well as the exhaustive religious/spiritual conceptual matrix outlined by Holder,

Coleman and Wallace (2010) and re-imagined by this author in Figure 1, it was hypothesized that the negative relationship between overall intelligence and overall spirituality would be relatively weak when compared to past research examining intelligence relative to self-endorsed religiosity. Similarly, it was predicted that the relationship between self-rated scores on the transcendent factor of the SWBQ and Shipley-2 measures of intelligence would be comparatively strong. As mentioned, belief in a God or any other sentient, supernatural agent requires one to suspend logic and instead reason intuitively. Pennycook et al. (2012) observed that as individual propensity to reason intuitively increased, so too did belief in God or other supernatural agents. Alternatively, as individual propensity to reason analytically increased, belief in a God or other supernatural agents decreased. Again, it was hypothesized that because abstract reasoning is a partial determinant of overall intelligence and is being measured explicitly in this study, the relationship between abstraction standard scores and the transcendent factor of the SWBQ would be relatively strong.

While a small, negative correlation was observed between overall cognitive ability and self-rated overall spirituality, the observed relationship between these two variables ($\tau = -.23$) was nearly the same as the reported mean correlation ($r = -.25$) observed between various measures of religiosity and intelligence reported in a recent meta-analysis study (Zuckerman, Silberman & Hall, 2013). Although it was predicted that the strongest negative relationship would be observed between overall spirituality and the abstraction standard score of the Shipley-2, no significant relationships were observed between overall spirituality and abstraction *or* vocabulary standard scores. If one considers not only the small sample size, but also the relatively uniform, non-representative demographic nature of the sample (i.e., all undergraduate university students), it is possible that if the sample was both larger and more representative of the general population that the results would be different.

The observed similarity between the historically and empirically dominant negative relationship when examining self-rated religiosity alongside intelligence, and the observed negative relationship between self-rated spirituality and intelligence among this particular participant sample is puzzling. That is, although there are certainly conceptual and individual differences between religiosity and spirituality, among this particular participant sample, utilizing a relatively crude estimate of intelligence, it would appear that one's self-rated spirituality is not differentially predicted by one's measured cognitive ability. The observed data,

when considered this way, essentially invalidates the conceptual matrix presented earlier in Figure 1.

However, if one considers the observed relationship between *only* the transcendent component of the SWBQ and Shipley-2 measures of intelligence, it is clear that the observed results not only corroborate past research examining self-rated religiosity relative to measures of intelligence, the results support the hypothesis that a relatively strong negative relationship would be observed between the transcendent factor of the SWBQ and Shipley-2 measures of overall intelligence and abstraction standard scores.

The transcendent factor is unique when considered alongside items probing other dimensions within the SWBQ. It is the only dimension within the SWBQ that is loosely defined before the questions are presented. Here, the transcendent factor is likened to some*one* or some*thing* beyond the human world; priming participants with constructs like God or Allah and thus hinting at notions of religion or religiosity; which are, in essence, personal life choices and/or beliefs that require one to suspend logic. The questions that probe this dimension are related to one's personal relationship, worship, oneness and peace with the transcendent. Ultimately, what is inadvertently and indirectly being measured here is the degree to which one endorses or believes in a sentient being that is non-human in the absence of any objective proof. As explained earlier, this maps onto one's propensity to engage in analytic reasoning which is measured via the abstraction task on the SWBQ.

The observed relationship between overall cognitive ability and the transcendent factor of the SWBQ (τ = -.37) was not only stronger than overall cognitive ability and overall spirituality (τ = -.23) among this particular participant sample, it was also stronger than the majority of past research examining self-rated religiosity relative to intelligence (r = -.25) (Zuckerman, Silberman, & Hall, 2013). Moreover, the relationship between abstraction standard scores and the transcendent factor of the SWBQ (τ = -.29) was marginally stronger than the relationship between overall spirituality and overall intelligence measures. As predicted, the relationship between vocabulary standard scores and the transcendent factor of spirituality was not only relatively weak, it was not significant.

Again, it was hypothesized that the negative relationship between the transcendent factor of spirituality – the factor most closely associated with notions of a God or some sort of omnipotent or sentient being – and overall intelligence would be relatively strong when

compared to overall spirituality or even the remaining factors of spirituality (i.e., personal, environmental and communal) within the SWBQ. Further, if one were to examine the relationship between the abstraction standard scores and the transcendent factor of the SWBQ, it was hypothesized that this relationship would be exaggerated when compared to only global measures of spirituality and intelligence. While vocabulary and abstraction each load onto an overall intelligence composite score, it was predicted that one's ability to reason or solve problems through abstraction would be more predictive of one's transcendent spirituality level. This pattern of results was observed among this particular participant sample.

Figure 1 (presented in chapter two) depicts four, exhaustive categories initially outlined by Holder, Coleman and Wallace (2010) wherein they establish that it is possible for one to be spiritual but not religious (e.g., not attend church yet possess a strong inner belief system), religious but not spiritual (e.g., attend church in body but not necessarily engage any further), be both religious *and* spiritual and neither religious nor spiritual. It was predicted that as one moves from being neither religious nor spiritual towards being both religious and spiritual, scores on standardized measures of intelligence, such as the Shipley-2, would decrease in a somewhat linear pattern. Additionally, if one considers the aforementioned research by Pennycook et al. (2012), where individual propensities to engage in abstract or intuitive reasoning can predict the likelihood of believing in some sort of supernatural or transcendent power, the pattern of results observed in this study were both anticipated and supported.

The SWBQ measures four factors of spirituality and throughout this paper, the empirical drive to refer to spirituality and religiosity as separate concepts has been stressed. The transcendent factor of spirituality appears to be the only salient factor within the SWBQ where religion or religiosity seems to be at least somewhat implied. Evidently, it is the only item that refers to some sort of external, non-human being. As mentioned, a main conceptual divergence between religiosity and spirituality appears to be one of orientation; inward or outward. Common notions or orthodox beliefs associated with mainstream religions indicate an outward orientation. That is, one orients themselves *towards* a God or supernatural being, ultimately in hope of salvation or the promise of an eternal afterlife. Alternatively, mainstream notions of spirituality hint at an inward orientation; how one relates to themselves, their environment and those around them.

The nature of the relationship between overall cognitive ability and overall spirituality observed in the current study was strikingly similar to past research examining self-endorsed religiosity relative to intelligence or cognitive ability. Also, the observed relationship between the transcendent factor of the SWBQ and overall cognitive ability was relatively strong. It is clear that the relatively large negative correlation observed between the transcendent factor of the SWBQ and overall cognitive ability lead to a stronger negative correlation between overall cognitive ability and overall spirituality than would exist otherwise.

To conclude, without the transcendent factor of the SWBQ - a factor that may be confounding spirituality with notions of religion - it is likely that the relationship between overall spirituality and Shipley-2 measures of cognitive abilities would be comparatively weak or perhaps even non-existent and thus closer to what was initially predicted. The results of this study illustrate (as many others have) that as individual cognitive ability increases, the likelihood of belief or self-endorsed subjective strength of relationship with some sort of transcendent being decreases.

Abstraction and Vocabulary Standard Scores relative to SWBQ

Aside from the communal factor of spirituality and the spiritual importance item within the SWBQ, a stronger negative relationship was observed between abstraction standard scores than vocabulary standard scores on all remaining items within the SWBQ. Again, these differences are demonstrated in Table 5. It is important to note, however, that the only relationship that reached significance was, as mentioned, abstraction standard score relative to the transcendent factor score.

Flanagan and Harrison (2012) noted that abstraction is thought to be a measure of fluid intelligence while vocabulary is thought to be a measure of crystallized intelligence. Whereas fluid reasoning is involved in novel tasks or problem-solving, crystallized intelligence is thought to be a measure of one's ability to utilize previously learned information or existing knowledge to solve problems. Because belief in a God or other sentient beings is counterintuitive (due to a lack of objective, observable proof) and therefore, in theory, a lapse (willful or other) in logic, abstraction standard score was hypothesized to be the strongest predictor of overall spirituality and, especially, the transcendent factor of the SWBQ (Pennycook et al., 2012; Zuckerman, Silberman, & Hall, 2013). Vocabulary standard score (i.e., crystallized intelligence), loads onto

one's overall intelligence heavily, but is likely less influential in this light because whether one believes in God or any other sentient being is likely less dependent on crystallized intelligence and instead, as Pennycook et al. (2012) demonstrated in their research, more related to one's propensity to engage in analytic reasoning, which again, is more closely related to abstract reasoning tasks, such as those on the Shipley-2. Because measures of spirituality, religiosity and cognitive abilities all exist along a continuum and not in binary, one's fluid intelligence (or abstraction ability) appeared to be relatively strongly related to most measures on the SWBQ.

Once again, the research question was: Given the historically robust negative correlation between self-rated religiosity and intelligence, what is the nature of the relationship between intelligence and self-rated spirituality? While overall cognitive ability does indeed predict degree of self-rated spirituality, contrary to what was hypothesized, for the current research sample, it would appear that measured, overall intelligence does not *differentially* predict self-rated spirituality or religiosity. This is because the observed negative relationship between self-rated spirituality and measured intelligence was nearly identical to meta-analysis research examining self-rated religiosity relative to measured intelligence. However, when one examines overall cognitive ability relative to overall spirituality and the transcendent factor of spirituality *within* the SWBQ, it would appear that overall cognitive ability is *less* predictive of one's overall spirituality than their self-rated scores on the transcendent factor of the SWBQ. Observed results that are tangentially related to the research question will now be discussed.

Tangential Findings

It was hypothesized that within the SWBQ, the transcendent factor would be most strongly correlated to the personal factor of spirituality. This is because Gomez and Fisher (2003) had repeatedly observed this pattern of results within their own research. Also, because it was hypothesized (and observed) that abstraction standard scores would be the strongest predictor of all factor scores on the transcendent factor of spirituality, it was also predicted that abstraction standard scores would be a relatively strong predictor of personal spirituality factor scores as well. While a small, negative correlation was observed, as mentioned, it did not reach the required significance levels. Aside from being related to overall spirituality, religion importance and spiritual importance items within the SWBQ (discussed later), the transcendent factor of spirituality was not significantly related to any other factors within the SWBQ.

Beyond patterns of results related only to chance sampling and the relatively small participant sample, it is not abundantly clear why the pattern of results observed among this particular participant sample would diverge from past research by Gomez and Fisher (2003). After all, the participant sample that the SWBQ was originally normed on consisted of over 800 post-secondary students, and while sex was relatively evenly distributed among their particular participant sample, this variable did not account for any significant differences among factor or composite scores. Moreover, the observed age-range among the large, post-secondary sample group was similar to this particular participant sample (i.e., 18-42 with a mean age of 20.2 versus the current sample population; 18-36 with a mean age of 20.6). Therefore, it is certainly likely that if the sample size was increased or the experiment repeated with a new participant sample, the transcendent factor of the SWBQ would relate most closely to the personal factor.

When one considers that a sense of community is a widely accepted, essential component and function of most mainstream religions (Atran & Norenzayan, 2004; Fisher, 1999, Gomez & Fisher, 2003) along with the widely publicized relationship between religiosity and intelligence (Zuckerman, Silberman & Hall, 2013), it was hypothesized that overall cognitive ability and, to a higher degree - abstraction standard scores - might predict communal factor scores within the SWBQ. Additionally, within their own research, Gomez and Fisher (2003) published a strong relationship between communal and environmental factor scores within the SWBQ. Therefore, because the environmental factor scores might vary with communal factor scores, a relationship between the environmental factor of the SWBQ and overall cognitive ability and abstraction standard scores was also hypothesized.

Weak, non-significant relationships were observed between both the communal and environmental factors of the SWBQ and observed Shipley-2 cognitive ability measures. Additionally, no significant relationship existed between self-endorsed strength of communal or environmental spirituality and self-endorsed strength on the transcendent factor of the SWBQ.

While the four factors of the SWBQ load onto overall spirituality in a remarkably uniform pattern, the relationship *between* the four main factors, or, how they relate to one another, varies widely. The observed pattern of results supports Gomez and Fisher's (2003) concept of a global, overall spirituality composite score. Additionally, this observed pattern (or lack thereof) of relationships between factors could be interpreted as evidence that all four factors are indeed separate and independent.

Again, community, or a sense of community, is both an important function and component of most mainstream religions. Because no relationship was observed between self-rated scores on the communal, environmental and transcendental spirituality factors, this observation may be interpreted as evidence that when considered outside of the context of religion, and instead within the realm of spirituality, the communal factor, or, more generally – community - may function differently. While a congregation implies religiosity, a community does not. While they may serve similar functions, it is apparent that community, at least within a spiritual context, may function differently than originally anticipated and this may yet again be a subtle definitional point of divergence between religiosity and spirituality.

Although Gomez and Fisher (2003) did observe a link between communal and environmental factor scores in their research, a feeling of oneness or a connection to the environment does not easily map onto traditional ideas of religiosity like it does with spirituality. For this reason, it is not surprising that no relationship was observed between this factor of the SWBQ and the Shipley-2 measures. It is not clear, however, why results within the SWBQ would diverge from Gomez and Fisher's research.

As previously noted, the concept of orientation can be utilized as a framework to illuminate a potential conceptual divergence between traditional notions of spirituality and religion or religiosity. Based on observed quantitative data alone, it would appear that when examined within the realm of spirituality, a sense of connectedness to the community (i.e., the communal factor on the SWBQ) functions differently than one might anticipate when examined alongside the transcendent factor of the SWBQ; the factor that is most closely associated with notions of a God and perhaps - religion. Whereas traditional notions and functions of religion suggest an overarching *outward* orientation and that community is an essential function of religion, spirituality is largely *inward* focused and therefore a sense of community may either not be as important, or it may function differently within the realm of spirituality. This may explain why no significant relationship was observed between the communal and transcendent factors of the SWBQ.

Religion and Spirituality Importance

Figure 1 depicts the hypothesized negative relationship between Shipley-2 measures of intelligence and self-rated measures of spirituality on the SWBQ. Further, past research

examining the nature of the relationship between self-rated religiosity and measured intelligence was used as precedence to hypothesize that self-rated religion and spirituality *importance* would relate in a similar way. This is because one's rating of their spirituality and religiosity could be assumed or extrapolated from self-rated scores on the religion or spiritual importance items. Therefore, it was hypothesized that a relatively strong negative correlation would be observed between measured overall cognitive ability and self-rated religion importance; even stronger than self-rated spirituality importance.

Although a significant, negative correlation was observed between overall cognitive ability, self-rated religion and self-rated spirituality importance, overall cognitive ability predicted nearly the same individual level of religion importance and spirituality importance. As one might expect, overall spirituality scores were more predictive of the degree of spirituality importance than religion importance. Similar to the pattern of results observed for Shipley-2 measures of intelligence relative to overall spirituality and the transcendent factor of the SWBQ, a relatively strong negative correlation was observed between the transcendent factor of the SWBQ and religion importance; even stronger than that observed between the transcendent factor of SWBQ and spirituality importance.

Religion is only explicitly referred to once within the SWBQ. When it is referred to, religion is juxtaposed to spirituality. Participants are simply asked how important religion and how important spirituality are in their lives. When considered alongside Shipley-2 measures of intelligence, this indirect and somewhat trivial method of probing spirituality and religion as separate items did replicate the widely publicized negative relationship between self-endorsed religiosity and measured intelligence. However, the observed relationship between self-endorsed spirituality and Shipley-2 measures of intelligence was nearly identical. When considered this way, it would seem that self-rated spirituality importance does not *differentially* predict individual measures of intelligence.

The nature of the observed results within the SWBQ conceptually validates this assessment tool. As one would likely anticipate, individual, self-rated spiritual importance was more predictive of overall spirituality ratings than self-rated religion importance. Further, the transcendent factor, the factor most laden with religious under or overtones within the SWBQ, was the only individual factor that interacted with the spiritual and religion importance items. While self-rated scores on the transcendent factor of the SWBQ did indeed predict spiritual

importance, the predictive strength of the transcendent factor scores was stronger relative to self-rated religion importance.

If the self-rated importance of spirituality and religion could be could be re-imagined as being indicative of one's self-endorsed spirituality and religiosity (observed results support the former and, to a lesser degree - the latter), then it would appear that religiosity and spirituality, while conceptually separate, do not *differentially* predict overall cognitive ability. That is, the observed relationship between spiritual importance, religious importance and overall measures of cognitive ability is not only strikingly similar to Zuckerman, Silberman and Hall's (2013) published meta-analysis examining self-endorsed religiosity relative to measured intelligence, it is nearly identical to the relationship observed between overall cognitive ability and overall spirituality measured in this study.

Considered alongside past research examining self-endorsed religiosity and measured intelligence, a diluted relationship between self-endorsed spirituality and measured cognitive ability was hypothesized. While observed results between the transcendent factor of the SWBQ and overall cognitive ability supports this hypothesis, the overarching evidence or evidence that maps most easily onto previous research suggests that overall cognitive ability does *not* differentially predict self-endorsed religiosity and spirituality. While one can remove the transcendent factor of spirituality from the SWBQ, one could easily argue that the decision to include it as a separate factor was not made lightly. A conclusion that can be drawn however, is that it would appear that the strength of the relationship with a transcendent being alone is more strongly related to one's overall cognitive ability than overall self-rated religiosity or spirituality.

Throughout this research document, the notion that religiosity and spirituality can and *should* be theoretically and conceptually separated has been addressed at length. However, it appears that while measured intelligence is indeed negatively related to degree of self-rated spirituality, the nature of the relationship between measured intelligence, self-rated religiosity and spirituality was nearly identical. The pattern of observed results in this current research in conjunction with results from previous research in this field suggests that individual belief in a transcendent being or beings may be primarily responsible for this particular pattern of results.

Limitations and Directions for Future Research

Among this participant sample, the nature of the relationship between overall intelligence and overall spirituality was nearly identical to that listed in a recent meta-analysis of research examining the relationship between intelligence and religiosity. In accordance with guidelines proposed by Berry (2005), there has been a recent paradigm shift among relevant empirical research in this area, moving towards investigating spirituality and religiosity as separate concepts or constructs.

One would predict that individual measures of self-endorsed religiosity would differ from individual measures of self-endorsed spirituality (see Figure 1). Holder, Coleman, and Wallace (2010) observed that self-rated spirituality was a better predictor of children's happiness (rated by parents *and* children) than self-rated religiosity. This study was unique because few empirical studies examine *both* religiosity and spirituality as separate variables within the same study. Finally, if one considers that the nature of the relationship between intelligence and self-rated religiosity is well-established, one would predict a different pattern of results when examining intelligence relative to self-rated spirituality. Therefore, future research should examine the nature of the relationship between self-rated religiosity, intelligence *and* self-rated spirituality. This will allow for a more detailed and complete examination of all possible interrelations between these variables with the same assessment tools and participant sample. In this particular research study, religiosity could only be assumed by self-rated religion importance and extrapolated from the transcendent factor of the SWBQ. Holder, Coleman and Wallace (2010) utilized the Brief Multidimensional Measurement of Religiousness/Spirituality tool to gather self-rated religiosity data. Therefore, future research could replicate and extend the current results by comparing measured cognitive ability via the Shipley-2 to results obtained on both the SWBQ and the Brief Multidimensional Measurement of Religiousness/Spirituality across the same participant sample.

In Chapter 2, the potential impact of both culture and language on the validity of scores yielded from standardized tests of intelligence was addressed. Additionally, the respective role of religion and spirituality almost certainly varies across global populations, religious denominations or sects. I argue that a uniform sample is desirable when examining factors such as intelligence, spirituality and religiosity – at least in this exploratory stage of research. This way, one can maximize chances that differences (or lack of differences) between constructs is

indeed related to the constructs themselves and not extraneous factors such as socio-economic status, culture, religious denomination or sect. Therefore, future studies should employ as uniform of a participant sample as possible. Ideally, this would mean that participants belong to the same religious denomination or sect, or, alternatively, do not belong to any religion or sect. Because the majority of standardized assessments of cognitive abilities (i.e., intelligence and its constituents) were largely normed among native English speaking samples, to maximize validity, the demographic of the participant sample should adhere closely to the assessment tools' normed test sample.

Conclusion

Due to the subjective, highly abstract and theoretical nature of both religiosity and spirituality, no consensual definition for either term exists. Orientation – inward or outward – and the institutional focus of religion were presented as two of the overarching differences between religiosity and spirituality. In any case, religiosity and what it may entail (i.e., a sense of community and a framework to understand the world) as well as individual feelings of spirituality have been positively linked to individual physical and mental health. However, from an empirical standpoint, the predominant negative relationship between religiosity and intelligence is well-established and has been relatively consistent for nearly 100 years. Whereas religiosity and spirituality have historically been assumed by one or the other, recent research has outlined, among other avenues, a need to refer to spirituality and religiosity as *separate* concepts. This prompted the research question: Given the historically robust negative correlation between self-rated religiosity and intelligence, what is the nature of the relationship between intelligence and self-rated spirituality?

Whether intuitive or analytic, individual characteristic patterns of reasoning that have been linked to intelligence and moreover, the likelihood of belief in a God or other omnipotent or supernatural beings, were utilized as a framework for the central hypothesis; a relatively weak, negative relationship would be observed between self-rated spirituality and overall cognitive ability (i.e., intelligence) when compared to the wealth of past research examining intelligence relative to self-rated religiosity.

Utilizing Kendall's tau-b statistical analytic procedure, the correlational strength between measured overall cognitive ability and self-rated overall spirituality was nearly the same as

recent meta-analysis research examining the relationship between cognitive ability, referred to as intelligence, and self-rated religiosity. This striking similarity is puzzling. However, if one examines the relationship between only the transcendent component of the SWBQ – the factor most closely associated with belief in a God or other supernatural agents – and overall cognitive ability *within* this particular participant sample, the hypothesis was supported. That is, overall cognitive ability was a stronger predictor of the transcendent factor of spirituality than overall spirituality or any of the remaining SWBQ factors of spirituality.

Future research that utilizes *separate* valid and reliable self-rated measures of religiosity and spirituality may perhaps replicate and extend the current research findings. That is, instead of assuming religiosity from the transcendent factor of the SWBQ, a separate self-rated measure of religiosity, such as the Brief Multidimensional Measurement of Religiousness/Spirituality combined with the SWBQ and a valid measure of individual intelligence would make for stronger conclusive evidence regarding the relationship between self-rated spirituality, self-rated religiosity and individual measures of intelligence.

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Appendix A

Is There a Relationship Between Spirituality and Intelligence?

You are invited to participate in an experiment entitled: Is There a Relationship Between Spirituality and Intelligence? Please read this consent form carefully and feel free to ask any questions you may have about the study.

Student-Researcher: Sean Sacher, Educational Psychology, sean.sacher@usask.ca

Principal Investigator: Tim Claypool, Department of Educational Psychology & Special Education, 306-966-6931; tim.claypool@usask.ca

Purpose and Procedure: The primary purpose of the current research project is to train and familiarize the graduate student-researcher with the research process. This research will be part of a Master's thesis dissertation and therefore results may be part of conference presentations. For the current study, we will attempt to examine the nature of the relationship between spirituality and intelligence. Participants will be required to define English words and solve reasoning problems. Participants will also be asked to respond to queries regarding individual levels of spirituality. The study should take approximately fifty minutes of your time.

Risks: There are no known risks associated with participation in this study. Furthermore, you may receive no personal benefits from participation in the study. At the end of the study you will be provided a debriefing form that better explains the nature of the study. You will also be given a chance to ask any further questions that you might have.

Confidentiality: Your data will be kept completely confidential and no personally identifying information will be linked to your data. All data will be reported in aggregated form. The data and consent forms will be stored securely at the University of Saskatchewan by the principal investigator. In the instance where the data is published in an academic journal and/or presented at a professional conference, the data will be stored for a maximum of five years after completion of the study. When the data is no longer required, it will be destroyed beyond recovery.

Compensation: Upon completion, participants will be compensated for their participation by means of two bonus credits via the psychology participant pool.

Right to withdraw: This study is entirely voluntary and you are not required to answer any questions that you are not comfortable with. You may withdraw from the study for any reason, at any time, without penalty of any sort and without loss of research credit for the session. If you withdraw from the study, any data that you have contributed will be destroyed beyond recovery. Because this survey is anonymous, once your answers have been submitted, they cannot be withdrawn.

Questions: If you have any questions concerning the study, please feel free to ask at any point. You are also free to contact the researchers at the e-mail addresses provided above if you have questions at a later time. The proposed research was reviewed and approved on ethical grounds by the Department of Psychology Research Ethics Committee on December 1st, 2014. Any questions regarding your rights as a participant may be addressed to the Behavioural Research Ethics Board through the Office of Research Services (306-966-2975). Out of town participants may call collect. You may obtain a copy of the results of the study by contacting the student-researcher or the principal investigator.

Consent to Participate: I have read and understand the description of the research study provided above. I have been provided with an opportunity to ask questions and my questions have been answered satisfactorily. I agree to participate in the study described above, understanding that I may withdraw my consent to participate at any time. A copy of this consent form has been given to me for my records.

_____ _____

(Signature of Participant) (Date)

_____

(Signature of Researcher)

Appendix B

Is There a Link Between Spirituality and Intelligence?
-Debriefing Form-

Student-Researcher: Sean Sacher, Educational Psychology, sean.sacher@usask.ca
Principal Investigator: Tim Claypool, Department of Educational Psychology & Special Education, 306-966-6931; tim.claypool@usask.ca

Thank-you for participating in this experiment, we hope that you found it interesting.

The purpose of this research is to examine if there is a relationship between individual measures of intelligence and spirituality. Moreover, if a relationship is observed, what is the nature of the relationship?

Past research has established a robust and highly-replicable negative correlation between various measures of *religiosity* and intelligence. This relationship has been widely observed in over 137 nations - representing approximately 95% of the global population.

Due to the individual and subjective nature with which religiousness and spirituality might be experienced, both terms are notoriously difficult to define. Indeed, no single empirical definition currently exists for either of these terms. For the current research, religiosity is loosely defined as institutionalized spirituality. For example, attending church/mass or participating in other forms of religious ceremonies. Spirituality encompasses one's relation to the self, to others, to the environment, and to some *One* or some*thing* beyond the human level (i.e., transcendent being, force, God etc.). Conceptually unique from religiosity, spirituality has somewhat recently immerged as a new, unique area of research. Leading scholars in this particular domain suggest that religiosity and spirituality be examined independently of one another in future research. Information regarding the direction of the relationship between spirituality and intelligence (or if a relationship is observed) could be used to inform whether the argument that religiosity and spirituality should indeed be investigated as separate concepts, is warranted.

Due to the exploratory nature of this research, it is difficult to hypothesize a single outcome. It is entirely possible that, similar to research examining religiosity alongside intelligence - a negative correlation between spirituality and intelligence will be observed. Some research has suggested that as the strength of religiousness increases, (i.e., as the strength of belief in supernatural entities such as Gods, spirits, ghosts increases), one is more likely to engage in intuitive reasoning. This form of reasoning could colloquially be described as going with one's "gut" feeling. As self-rated religiousness *decreases*, likelihood of analytic reasoning (a more deductive, fact-based form of reasoning) increases. Because standardized intelligence tests heavily favor those who engage in the latter form of reasoning, it has been suggested that those who score low on religiousness will perform better on these popular, standardized tests of intelligence. It is also possible that no relationship between spirituality and intelligence will be observed, thus strengthening the argument that religiosity and spirituality are indeed separate theoretical concepts and should be treated as such.

If you have any further questions or would like to receive final results, please contact the student-researcher or the principal investigator. If you are interested in further investigating this avenue of research on your own, some resources have been included on the back of this debriefing form.

Again, your participation is appreciated.

Resources:

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